

WHAT IS CLAIMED IS:

1. ✓ A method of preparing a fibrous protein smectic hydrogel, comprising:
 - a. pouring an aqueous fibrous protein solution into a container comprising a solvent that is not miscible with water;
 - 5 b. sealing the container and allowing it to age at about room temperature; and
 - c. collecting the resulting fibrous protein smectic hydrogel and allowing it to dry.
2. The method of claim 1, wherein the solvent is chloroform.
3. The method of claim 1, wherein the solvent is iso-amyl alcohol.
4. The method of claim 1, wherein the solvent is hexane.
- 10 5. The method of claim 1, wherein the fibrous protein is selected from the group consisting of silk, collagens, keratins, actins, chorions, and seroins.
6. The method of claim 1, wherein the fibrous protein is silk.
7. The method of claim 1, wherein the fibrous protein solution is present in greater than about 4% by weight.
- 15 8. The method of claim 1, wherein the fibrous protein solution is present in greater than or equal to about 8% by weight.
9. The method of claim 1, wherein the fibrous protein solution is present in greater than about 4% by weight, the fibrous protein is silk, and the solvent is iso-amyl alcohol.
- 20 10. The method of claim 1, wherein the fibrous protein solution is present in greater than or equal to about 8% by weight, the fibrous protein is silk, and the solvent is iso-amyl alcohol.
11. The method of claim 1, wherein the fibrous protein solution is present in greater than about 4% by weight, the fibrous protein is silk, and the solvent is chloroform.
- 25 12. The method of claim 1, wherein the fibrous protein solution is present in greater than or equal to about 8% by weight, the fibrous protein is silk, and the solvent is chloroform.
13. The method of claim 1, wherein the fibrous protein solution is present in greater than about 4% by weight, the fibrous protein is silk, and the solvent is hexane.
- 30 14. The method of claim 1, wherein the fibrous protein solution is present in greater than or equal to about 8% by weight, the fibrous protein is silk, and the solvent is hexane.

15. The method of claim 1, wherein the smectic hydrogel is a bulk solid hydrogel comprising several ordered layers of the fibrous protein.
16. A method of obtaining predominantly one enantiomer from a racemic mixture, comprising the steps of:
- 5 a. pouring an aqueous fibrous protein solution into a container comprising a solvent that is not miscible with water;
- b. sealing the container and allowing it to age at about room temperature;
- c. allowing the enantiomers of the racemic mixture to diffuse selectively into the smectic hydrogel in solution;
- 10 d. removing the smectic hydrogel from the solution;
- e. rinsing predominantly one enantiomer from the surface of the smectic hydrogel;
- and
- f. extracting predominantly one enantiomer from the interior of the smectic hydrogel.
- 15 17. The method of claim 16, wherein the fibrous protein is selected from the group consisting of silk, collagens, keratins, actins, chorions, and seroins.
18. The method of claim 16, wherein the fibrous protein is silk.
19. The method of claim 16, wherein the fibrous protein solution is present in greater than about 4% by weight.
- 20 20. The method of claim 16, wherein the fibrous protein solution is present in greater than or equal to about 8% by weight.
21. The method of claim 16, wherein the fibrous protein solution is present in greater than about 4% by weight and the fibrous protein is silk.
22. The method of claim 16, wherein the fibrous protein solution is present in greater than or equal to about 8% by weight and the fibrous protein is silk.
- 25 23. The method of claim 16, wherein the smectic hydrogel is a bulk solid hydrogel comprising several ordered layers of the fibrous protein.
24. A fibrous protein smectic hydrogel prepared according to the method of claim 1.
25. The fibrous protein smectic hydrogel of claim 24, wherein the fibrous protein is selected from the group consisting of silk, collagens, keratins, actins, chorions, and seroins.
- 30 26. The fibrous protein smectic hydrogel of claim 24, wherein the fibrous protein is silk.

27. The fibrous protein smectic hydrogel of claim 24, wherein the fibrous protein smectic hydrogel is greater than or equal to about 38 nm thick.
28. The fibrous protein smectic hydrogel of claim 25, wherein the fibrous protein smectic hydrogel is greater than or equal to about 38 nm thick.
- 5 29. The fibrous protein smectic hydrogel of claim 26, wherein the fibrous protein smectic hydrogel is greater than or equal to about 38 nm thick.
30. The fibrous protein smectic hydrogel of claim 24, wherein the fibrous protein smectic hydrogel is a bulk solid comprising several ordered layers of the fibrous protein.

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